

04.01-6/1/02-2979



Marine Corps Base, Camp Lejeune

Proposed Remedial Action Plan

Operable Unit No. 19 (Site 84 / Building 45 Area)

June 2002

This document is the Proposed Remedial Action Plan (PRAP) for Operable Unit (OU) No. 19 (Site 84) at Marine Corps Base (MCB), Camp Lejeune, North Carolina. MCB, Camp Lejeune has been investigating sites through the Department of Defense (DoD) Installation Restoration (IR) Program. The goal of the IR Program is to identify, assess, characterize and clean up or control contamination from past waste disposal operations. Public comment is invited and encouraged on the alternatives evaluated for OU No. 19.

OVERVIEW

MCB, Camp Lejeune is a training base for the U.S. Marine Corps located in Onslow County, North Carolina. The facility covers approximately 236 square miles and includes 14 miles of shoreline. Operable Unit (OU) No. 19 (Site 84 / Building 45 area) is one of 21 OUs located within MCB, Camp Lejeune. Site 84 is located near the center of the northern border of MCB, Camp Lejeune. This PRAP presents an overview of the history and investigations conducted to date, and identifies the final proposed remedial actions for Site 84.

PURPOSE

This PRAP is issued to describe MCB, Camp Lejeune's preferred remedial actions for Site 84. These actions have been reviewed by and agreed upon by state and Federal environmental regulators. This PRAP has been prepared and solicited for comment as part of the DoDs public participation responsibility under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended, and Section 300.430(f) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), and the Federal Facility Agreement (FFA) between MCB, Camp Lejeune, the United States Environmental Protection Agency (USEPA), and the State of North Carolina Department of Environment and Natural Resources (NC DENR).

This PRAP summarizes detailed information found in the Final Remedial Investigation (RI) Report and the Final Feasibility Study (FS) Report for OU No. 19, as well as documents referenced in those reports. The public is encouraged to review all documents in order to gain a more comprehensive understanding of the site. The Administrative Record, which contains all relevant documents with respect to OU No. 19 and the IR Program, is available for public review at the Onslow County Public Library and at MCB, Camp Lejeune.

COMMUNITY ROLE

MCB, Camp Lejeune relies on public input to ensure that the concerns of the community are considered in selecting a remedy for each site. Reports on the site have been made available for the public comment period. A public meeting will be held on June 18, 2002 starting the 30-day public comment period to present the conclusions of the RI, and to propose the final remedial action for Site 84. Comments received at the public meeting, as well as written comments received during the 30-day public comment period, will be addressed in the Responsiveness Summary section of the Record of Decision (ROD). The ROD formalizes the selection of the remedy.

SITE DESCRIPTION AND HISTORY

Site Description:

- South of Highway 24 on the northern border of MCB, Camp Lejeune
- One mile west of the MCB, Camp Lejeune main gate entrance
- Vehicular access to Site 84 along Highway 24 is restricted by a chain link fence
- Study area is bordered to the north by railroad tracks, the west by Northeast Creek, and extends to the south and east to encompass the former Building 45 and a small, man-made lagoon.
- Most of Site 84 is wooded or covered by thick vegetation or grass.

DATES TO REMEMBER

6/18/2002 - 7/18/2002 - Public Comment Period for Site 84

6/18/2002 - 6:00 PM Public Meeting at the Coastal Carolina Community College



Figure 1: Aerial view of Site 84

- An access road runs through the site and ends at an electrical substation just south of the site.
- A former railroad line and right-of-way along the northern portion of Site 84 are being transferred to the City of Jacksonville for a rails-to-trails project.

Site History:

- Building 45 was a former electric substation where transformers reportedly containing polychlorinated biphenyls (PCBs) were used and possibly stored.
- Based upon discussions with maintenance personnel at Building 45, the lagoon was used to contain discharges from Building 45. A 12-inch diameter concrete pipe discharged into the southeastern end of the lagoon. The pipe was connected to the oil/water separator located outside of the former Building 45. However, it is believed that prior to the installation of the oil/water separator, the pipe was connected directly to the building floor drains.
- A transformer was found east of the former substation, and approximately 20 transformers, potentially containing PCB transformer oil, were removed from the lagoon.
- Maintenance personnel at Building 45 have indicated that additional transformers may still be buried in areas near the lagoon; however, it was reported that public works had performed minor excavations in the area and did not discover any further buried materials.

PREVIOUS INVESTIGATIONS

Previous investigations at Site 84 have included:

- UST Site Check Investigation Report, Building 45, UST S-941-2
- Site Assessment, Tank S741, Midway Park
- Five well site check and resample one existing well
- Leaking UST Site Assessment Report, Building 45, UST S-941-2
- Relative Risk Ranking System Data Collection Investigation
- Pre-Remedial Investigation Screening Study
- Draft Engineering Evaluation/ Cost Analysis
- GW-UST 12 Report, UST Removal at Building 45
- Trip Report, Site 84 - Building 45 Area

- Draft Action Memorandum, Site 84 - The Building 45 Area
- Non-Time Critical Removal Action, Operable Unit No. 19, Site 84 / Building 45 Area
- Remedial Investigation, Operable Unit No. 19, Site 84 / Building 45 Area

Non-Time Critical Removal Action

The aboveground portions of Building 45 were removed in 1999, but the foundation was left in place. A fence was installed along the perimeter of the building foundation. Removal of the foundation and adjacent contaminated soils is planned as a non-time-critical removal action (NTCRA), and is scheduled to be completed in Summer 2002. The NTCRA will address removal of the foundation and a limited amount of impacted soil adjacent to Building 45.

Remedial Investigation

Baker conducted the Remedial Investigation in 2001. The RI field program consisted of a surface and subsurface soil investigation, trenching to locate a buried pipe, and a shallow groundwater investigation. The focus of the soil investigation included the area surrounding Building 45 and northeast of the gravel road leading to Northeast Creek, as contamination in other areas had not been detected previous investigations. The results of the RI are described below. Note that the investigation results discussed in the following paragraphs are provided in detail in the Final Remedial Investigation Report and in previous reports, which have been reviewed and approved by the USEPA and NC DENR.

Surface Soil Investigation

Surface soil analytical data were screened using USEPA Region IX Residential Preliminary Remediation Goals (PRGs), North Carolina State Underground Storage Tank (UST) Program guidance, and Toxic Substances Control Act (TSCA) guidelines to assess which contaminants require further consideration.

PCBs - A total of 95 surface soil samples were analyzed at a fixed based laboratory for PCBs. Aroclor-1260 was detected in 68 of 95 samples at concentrations ranging from 18 to 200,000 micrograms per kilogram ($\mu\text{g}/\text{kg}$). Aroclor-1248 was detected in 4 of 95 samples, ranging from 56 $\mu\text{g}/\text{kg}$ to 160,000 $\mu\text{g}/\text{kg}$ and Aroclor-1254 was detected in only one sample at 51,000 $\mu\text{g}/\text{kg}$. The TSCA high-occupancy land use screening criteria for all PCBs is 1,000 $\mu\text{g}/\text{kg}$. A total of 60 surface soil samples were analyzed in the field for PCBs using Ensys Test Kits. The screening criteria of 1,000 $\mu\text{g}/\text{kg}$ was exceeded in 33 of these samples. Widespread PCB contamination in surface soils reflects the site's history as an electrical substation. The PCB contamination is likely traced to transformer oil and substation by-products.

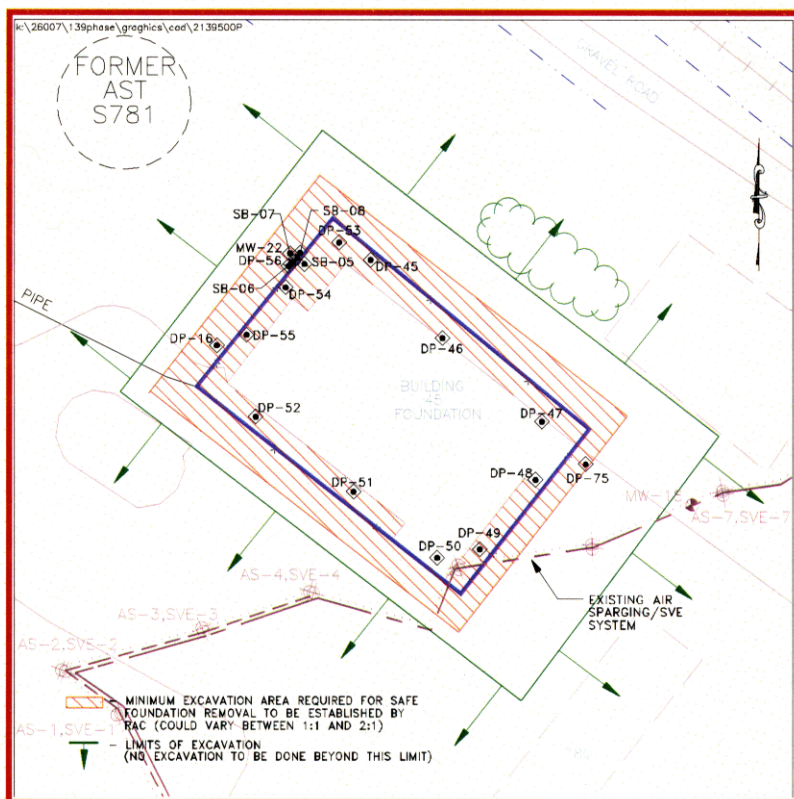


Figure 2: Red hashing shows minimum area of soil to be removed during NTCRA. No soils will be removed beyond the green line.

Volatile Organic Compounds (VOCs) - A total of 26 surface soil samples were analyzed for VOCs. Only acetone, 2-butanone, ethylbenzene and xylenes were positively detected. No detected VOCs exceeded the Region IX Residential PRGs.

Semi-Volatile Organic Compounds (SVOCs) - A total of 21 SVOCs were detected in surface soil samples. Nine of 21 SVOCs were detected at concentrations exceeding Region IX Residential PRGs. The PRGs were exceeded for a class of SVOCs known as polynuclear aromatic hydrocarbons (PAHs), which include the following compounds (ranges of detection in parentheses):

- | | |
|--|--------------------|
| • Benzo(a)anthracene (520 µg/kg to 190,000 µg/kg) | PRG = 620 µg/kg |
| • Benzo(a)pyrene (470 µg/kg to 150,000 µg/kg) | PRG = 62 µg/kg |
| • Benzo(b)fluoranthene (540 µg/kg to 170,000 µg/kg) | PRG = 620 µg/kg |
| • Benzo(k)fluoranthene (340 µg/kg to 120,000 µg/kg) | PRG = 6,200 µg/kg |
| • Chrysene (560 mg/kg to 180,000 µg/kg) | PRG = 62,000 µg/kg |
| • Dibenzo(a,h)anthracene (70 µg/kg to 17,000 µg/kg) | PRG = 62 µg/kg |
| • Indeno(1,2,3-cd)pyrene (250 µg/kg to 59,000 µg/kg) | PRG = 620 µg/kg |

Pesticides - A total of 24 samples collected at Site 84 were analyzed for pesticides. Six of 14 pesticides analyzed for were detected at concentrations exceeding the Region IX Residential PRGs including:

- | | |
|---|-------------------|
| • 4,4'-DDD (3.2 µg/kg to 3,000 µg/kg) | PRG = 2,400 µg/kg |
| • Dieldrin (3.5 µg/kg to 320 µg/kg) | PRG = 30 µg/kg |
| • Heptachlor (1.5 µg/kg to 22,000 µg/kg) | PRG = 110 µg/kg |
| • Heptachlor epoxide (4.2 µg/kg to 4,500 µg/kg) | PRG = 53 µg/kg |
| • alpha-Chlordane (2 µg/kg to 48,000 µg/kg) | PRG = 1,600 µg/kg |
| • gamma-Chlordane (3.9 µg/kg to 58,000 µg/kg) | PRG = 1,600 µg/kg |

Inorganic Compounds - A total of 26 surface soil samples were analyzed for inorganics with 22 constituents detected. No detected inorganics exceeded the Region IX Residential PRGs.

Total Petroleum Hydrocarbons (TPH) - TPH was analyzed in 11 surface soil samples collected at Site 84. TPH diesel-range organics (TPH-DRO) were detected in all 11 samples at concentrations ranging from 7 mg/kg to 470 mg/kg. TPH gasoline-range organics (TPH-GRO) were detected in one sample at 0.88 mg/kg. However, after the planned removal action (NTCRA), TPH contamination will be limited to one area, located just west of the Building 45 area.

Subsurface Soil Investigation

Like surface soil, subsurface soil analytical data were screened using Region IX Residential PRGs, North Carolina State UST Program guidance, and TSCA guidelines to assess which contaminants require further consideration.

PCBs - A total of 39 subsurface soil samples were analyzed for PCBs by a fixed based laboratory. Aroclor-1260 was detected in 11 of 39 samples at concentrations ranging from 13 J µg/kg to 45,000 µg/kg. Aroclor-1248 was detected in one sample at 47,000 µg/kg and Aroclor-1254 was detected in one sample at 5,000 µg/kg. Five subsurface soil samples were also analyzed in the field using Ensys Field Testing Kits. Four of these five samples had PCB detections that exceeded the TSCA high-occupancy screening criteria of 1,000 µg/kg. After the NTCRA, areas of subsurface PCB contamination will remain in the central part of Site 84.

Volatile Organic Compounds (VOCs) - Twenty-four subsurface soil samples were analyzed for VOCs. There were ten VOCs detected in the subsurface soil samples, none of which exceeded Region IX Residential PRGs.

Semi-Volatile Organic Compounds (SVOCs) - Thirty-three samples were analyzed for SVOCs. A total of twenty-two SVOCs were detected, five of which exceeded Region IX Residential PRGs. The PRGs were exceeded for a class of SVOCs known as PAHs, which include the following:

- Benzo(a)anthracene (640 µg/kg to 3,000 µg/kg) PRG = 620 µg/kg
- Benzo(a)pyrene (590 µg/kg to 2,600 µg/kg) PRG = 62 µg/kg
- Benzo(b)fluoranthene (68 µg/kg to 2,800 µg/kg) PRG = 620 µg/kg
- Dibenzo(a,h)anthracene (98 µg/kg to 430 µg/kg) PRG = 62 µg/kg
- Indeno(1,2,3-cd)pyrene (340 µg/kg to 1,200 µg/kg) PRG = 620 µg/kg

Pesticides - Eleven pesticides were detected in subsurface soil samples. Four of 14 pesticides analyzed for were detected at concentrations exceeding the Region IX Residential PRGs in three samples, including:

- Heptachlor (1.6 µg/kg to 6,900 µg/kg) PRG = 110 µg/kg
- Heptachlor epoxide (63 µg/kg and 200 µg/kg) PRG = 53 µg/kg
- alpha-Chlordane (3.3 µg/kg to 14,000 µg/kg) PRG = 1,600 µg/kg
- gamma-Chlordane (3.3 µg/kg to 18,000 µg/kg) PRG = 1,600 µg/kg

Inorganics - Thirty-three samples were analyzed for inorganics with 22 constituents detected. No detected inorganics exceeded the Region IX Residential PRGs.

Total Petroleum Hydrocarbons (TPH) - Eight subsurface soil samples were analyzed for TPH-DRO and TPH-GRO. TPH-DRO was detected in all eight samples, however, TPH concentrations exceeded North Carolina State UST regulations at only one location. TPH-GRO was detected at levels above North Carolina State UST regulations at this same location. The detections are likely from a nearby aboveground storage tank. This tank has been removed.

Test Pits

Two soil samples were collected from each of the three test pits located along the length of the drainage pipe leading from Building 45 to the lagoon and were analyzed for PCBs. The purpose of this sampling effort was to determine if the drainage pipe leading from Building 45 to the lagoon has leaked. Aroclor-1260 was detected in all six samples. The detection of Aroclor-1260 in all six samples is evidence that the pipe potentially leaked.

Groundwater

Groundwater data are screened against North Carolina Water Quality Standards (NCWQS) and Federal Maximum Contaminant Levels (MCLs). Groundwater sampling events were conducted in 1995, 1998 and 2001.

Organics - Groundwater samples in 1995 were analyzed only for PCBs. There were no detections of PCBs during this round of sampling. In 1998, groundwater was analyzed only for VOCs. A total of six monitoring wells were sampled, which included shallow and intermediate well clusters at three separate locations. Benzene and ethylbenzene were detected at low concentrations at monitoring well cluster 84-MW03 and 84-MW04. The detections of benzene slightly exceeded the NCWQS of 1.0 µg/L, but were below the Federal MCL. Ethylbenzene concentrations in each of these monitoring wells were below both state and Federal standards. Chloroform was detected at 16 µg/L in monitoring well cluster 84-MW11 and 84-MW12. This concentration exceeds the NCWQS of 0.19 µg/L, but is less than the Federal MCL.

In 2001, 14 groundwater samples were collected and analyzed for VOCs, SVOCs, PCBs, pesticides, herbicides and metals. There were no exceedances of screening criteria for any of the VOCs or SVOCs. Seven pesticides were detected in these samples, with two exceeding the MCL and/or NCWQS. Gamma-chlordane exceeded the NCWQS at well 84-MW18. Also, heptachlor epoxide exceeded the NCWQS at well 84-MW20. The herbicide 2-Methyl-4-Chlorophenoxyacetic Acid (MCPA) was detected in one groundwater sampling location at 44 µg/L during the 2001 sampling event.

Inorganics - A total of 19 metals were detected in groundwater samples collected in August of 2001. Aluminum exceeded the Secondary MCL in seven samples. Antimony was detected above the MCL in one sample. All detections of iron exceeded both the Secondary MCL and NCWQS. Detections of manganese exceeded both the MCL and NCWQS in six samples. Arsenic was detected above screening criteria only in the 84-MW07 and 84-MW08 cluster. Thallium was detected in two wells, 84-MW08 and 84-MW17, both above screening criteria.

Sediment

In October 1995, seven sediment samples were collected at Site 84 and analyzed for PCBs. Three of the samples were collected from Northeast Creek and four of the samples were collected from the lagoon. No PCBs were detected in the sediment samples collected from Northeast Creek; however, PCBs were detected in each of the four samples collected from the lagoon. During the March 1998 sampling event, three additional sediment samples were collected from the lagoon and exhibited PCB contamination that was above TSCA guidelines. Aroclor-1260 was detected in all seven lagoon sediments at concentrations ranging from 3,700 to 40,000 µg/kg. Aroclor-1248 was detected in one lagoon sediment sample at 2,800 µg/kg. VOCs and SVOCs were also detected in one sediment sample from the lagoon. The detected SVOCs were above screening criteria.

SUMMARY OF SITE RISKS

As part of the RI, a human health risk assessment (RA) and an ecological RA were conducted to determine the potential risks associated with the chemical constituents detected at Site 84. The NTCRA implemented for removal of the Building 45 foundation and surrounding contaminated soil is scheduled to be completed in the Summer of 2002. Therefore, risk assessments presented here depict risk remaining after the completion of the removal action.

Human Health Risk Assessment

The human health risk assessment evaluated exposures to site chemicals of potential concern (COPCs) for the following potential receptors:

Current Base Personnel - Current Base personnel were evaluated for ingestion and dermal exposures to site COPCs in surface soil, surface water, sediment and inhalation of fugitive dusts from surface soil. There were no carcinogenic risks or adverse non-carcinogenic health hazards calculated that exceeded the USEPA's acceptable criteria for the Base personnel for the after NTCRA scenario.



Figure 3: A view of the lagoon located on the western portion of Site 84

Current Adult and Adolescent Recreational Users - Current adult and adolescent recreational users were evaluated for ingestion and dermal exposures to site COPCs in surface soil, surface water, and sediment, and inhalation of fugitive dusts from surface soil. There were no carcinogenic risks or adverse non-carcinogenic health hazards calculated that exceeded USEPA's acceptable criteria for the current adult and adolescent recreational users for the after NTCRA scenario.

Future Adult and Child Residents - Future adult and child residents were evaluated for ingestion and dermal exposures to site COPCs in surface soil, groundwater, surface water, sediment, inhalation of fugitive dusts from surface soil, and inhalation of volatiles while showering. Potentially unacceptable total site risk estimates included an Incremental Lifetime Cancer Risk (ILCR) value of 6.2×10^{-4} and a Hazard Index (HI) value of 16 derived for future adult residents, and an ILCR value of 6.4×10^{-4} and a HI value of 36 derived for future child residents. Potential exposure to shallow groundwater and surface soil comprised the elevated risk and hazard values.

Ingestion of Aroclor-1260 in the surface soil was the main contributor (greater than 80 percent) to the elevated surface soil ILCR for the future adult and child residents. Ingestion of arsenic was the main contributor to the elevated groundwater ILCR for the future adult and child residents. Ingestion of iron, arsenic, and MCPA were the main contributors to the groundwater HI values of 16 for the adult and 35.7 for the child.

Therefore, based on the post NTCRA exposure scenario, potentially unacceptable risks for future adult and child residents may be associated with exposure to surface soil and shallow groundwater at Site 84.

Future Construction Workers - Future construction workers were evaluated for ingestion and dermal exposures to site COPCs in surface soil and subsurface soil; dermal exposures to groundwater, surface water and sediment; and inhalation of fugitive dusts from surface and subsurface soil. For the post NTCRA scenario, the potentially unacceptable total site hazard estimate for this receptor was a HI value of 1.6. The elevated HI value resulted primarily from dermal contact with shallow groundwater. Antimony, MCPA, iron, manganese, and thallium contributed to the groundwater HI value of 1.35. However, the Hazard Quotient (HQ) values for the aforementioned inorganics and MCPA in groundwater did not exceed 1.0.

Surface soil, subsurface soil, surface water, and sediment exposure did not contribute significantly to the total site risk or hazard levels. Therefore, based on the after NTCRA exposure scenario, potentially unacceptable risks for future construction worker may be associated with exposure to shallow groundwater at Site 84.

Future Industrial/Commercial Site Workers - These receptors were evaluated for ingestion and dermal exposures to site COPCs in surface soil and groundwater, and inhalation of fugitive dusts from surface soil and volatiles in groundwater. Potentially unacceptable total site risk estimates for Site 84 included an ILCR value of 4.5×10^{-4} and a HI value of 11.45. Potential exposure to shallow groundwater was the primary contributor these elevated risk and hazard values.

Surface soil contributed slightly to the total site risk. Ingestion of and dermal contact with benzo(a)pyrene, heptachlor, and Aroclor-1260 in the surface soil contributed to the elevated surface soil ILCR.

Ingestion of arsenic was the main contributor to the elevated groundwater ILCR of 3.2×10^{-4} . Ingestion of iron, arsenic, MCPA, and thallium were the main contributors to the groundwater HI value of 11.4. The percent contribution of iron to exposures by ingestion of groundwater was approximately 26 percent (HQ = 2.2). The percent contribution of arsenic to exposures by ingestion of groundwater was approximately 18 percent (HQ = 2). The percent contribution of MCPA to exposures by ingestion of groundwater was approximately 16 percent (HQ = 1.7). The percent contribution of thallium to exposures by ingestion of groundwater was approximately 16 percent (HQ = 1.7).

Therefore, based on the exposure scenario including soil after the NTCRA, potentially unacceptable risks for future industrial/commercial site worker may be associated with shallow groundwater investigated at Site 84.

A screening-level Ecological Risk Assessment (ERA) and refined risk evaluation were conducted to evaluate potential risks to ecological receptors at the site. Terrestrial habitat, aquatic habitat associated with the lagoon, and aquatic habitat associated with Northeast Creek were evaluated. Media evaluated for the ERA included surface soil, surface water, sediment, and groundwater. No protected species have been reported or observed at Site 84. The site is not located within any areas identified as ecologically protected or of significant natural value.

The following sections summarize the results of the ecological risk assessment for the various environmental media evaluated in the ERA:

Surface Soils - Ecological Chemicals of Concern (ECOCs) in surface soils include VOCs, SVOCs, pesticides, PCBs, and inorganics. After the removal action, potential risks contributed by surface soils are reduced substantially. The PCB Aroclor-1260 was the greatest risk-driver in surface soils. This compound was estimated to pose high risk to terrestrial flora and fauna, with a refined HQ of 299. It was also estimated to pose low to moderate risk to upper trophic level receptors including the short-tailed shrew, white-footed mouse, American robin, and eastern screech owl (refined HQs = 30.80, 4.44, 7.16, and 4.82, respectively). Aroclor-1260 was widespread across the site (detected in 58 of 77 surface soil samples).

Lagoon Sediment and Surface Water - The VOC xylene, SVOCs 2-methylnaphthalene, bis(2-ethylhexyl)phthalate, naphthalene, and phenanthrene, and PCBs Aroclor-1248 and Aroclor-1260 pose moderate to high risks to benthic invertebrates. The greatest risk drivers in lagoon sediment were 2-methylnaphthalene (refined HQ = 494.32) and Aroclor-1260 (refined HQ = 654.76). Diesel Range Organics were identified as an ECOC due to a lack of screening values for the class of compounds. No ECOCs were identified in surface water of the lagoon. Upper trophic level receptors using the lagoon are at risk from Aroclor-1248 and Aroclor-1260.

Northeast Creek Sediment and Surface Water - No ECOCs were identified in surface water or sediment of Northeast Creek. It is noted that PCBs were the only compounds analyzed in these media.

Groundwater - Fourteen compounds were identified as ECOCs in groundwater. The VOCs 2-butanone, chloromethane, and methyl tert-butyl ether, the herbicides dinoseb and MCPA, and the inorganics aluminum, beryllium, cobalt, iron, and manganese were identified as ECOCs due to a lack of screening criteria. The pesticides endosulfan I, heptachlor epoxide, and gamma-chlordane were estimated to have a low potential to cause unacceptable risks to aquatic receptors, with refined HQs less than 3.0. The pesticide 4,4'-DDT was estimated to have a moderate potential to pose unacceptable risks to aquatic receptors. It is noted that the evaluation of groundwater risks is conservative in that it assumes no dilution or natural attenuation of groundwater contaminants upon discharge to the surface water body. Under a dilution scenario with a factor of 10, refined HQs for endosulfan I, heptachlor epoxide, and gamma-chlordane would be less than one and they would not be retained as ECOPCs. Refined HQs for 4,4'-DDT accounting for dilution would indicate a low potential for adverse effects (refined HQ diluted = 1.71).

SUMMARY OF ALTERNATIVES

A wide range of potential RAAs are available that represent various levels of response actions, remediation goals, potential future land uses, land use controls and remediation costs. The following remedial alternatives are presented to address PCB, TPH, SVOC and pesticide contamination in soil and lagoon sediment at Site 84. Two alternatives are also presented to address inorganics, pesticides and organics present in groundwater at Site 84.

Soil:

RAA 1: No Action

\$0

- No remedial actions taken

RAA 2: Excavation and Landfill Disposal (High-Occupancy Land Use, "No Access Restrictions")

\$1,311,100

- Excavation of contaminated soil in excess of high-occupancy land use goals (PCBs > 1 mg/kg), including wetlands and wooded areas

- Solidification and removal of lagoon sediments
- Off-site disposal to appropriate permitted facilities
- Site restored to pre-excavation conditions
- Wetlands restoration
- Fencing along northern site border to protect potential recreational trespassers

RAA 2a: Excavation and Landfill Disposal (High-Occupancy Land Use, "Access Restrictions")

\$1,012,700

- Excavation of contaminated soil in excess of high-occupancy land use goals (PCBs > 1 mg/kg), excluding wetlands and wooded areas
- Solidification and removal of lagoon sediments
- Off-site disposal to appropriate facilities
- Fencing upper northwest corner of the site (area to be designated as low-occupancy)
- Site restored to pre-excavation conditions
- Wetlands restoration
- Fencing along northern site border to protect potential recreational trespassers

RAA 3: Excavation and Capping (High-Occupancy Land Use, "No Access Restrictions")

\$1,025,800

- Site-wide soil cover over soils < 10 mg/kg PCBs
- Soil exceeding 10 mg/kg PCBs and high-occupancy land use remedial goals is excavated and removed
- Solidification and removal of lagoon sediments
- Wetlands restoration
- Fencing along northern site border to protect potential recreational trespassers

RAA 3a: Excavation and Capping (High-Occupancy Land Use, "Access Restrictions")

\$862,400

- Soil cover over soils < 10 mg/kg PCBs in open areas
- Soil in open areas exceeding 10 mg/kg PCBs excavated and removed
- Solidification and removal of lagoon sediments
- Fence upper northwest corner of the site (designate as low-occupancy)
- Fencing along northern site border to protect potential recreational trespassers

RAA 4: Excavation and Landfill Disposal (Low-Occupancy Land Use)

\$820,600

- Excavation of contaminated soil above the EPA directive of 10 mg/kg, including wetlands and wooded areas
- Solidification and removal of lagoon sediments
- Off-site disposal to appropriate permitted facilities
- Site restored to pre-excavation conditions
- Wetlands restoration
- Fencing along entire site perimeter to protect potential recreational trespassers

RAA 5: Hot Spot Removal and Institutional Controls (Low-Occupancy Land Use)

\$786,000

- Excavation of soil in excess of low-occupancy land use goals with no additional controls (PCBs > 25 mg/kg)
- Off-site disposal to a permitted facility
- Solidification and removal of lagoon sediments
- Site restoration
- Fencing along entire site perimeter to protect potential recreational trespassers

RAA 6: Hot Spot Removal and Fencing (Low-Occupancy Land Use)

\$540,200

- Excavation of soil that exceeds low-occupancy land use goals if the site is fenced (PCBs > 50 mg/kg)
- Solidification and removal of lagoon sediments

- Fencing and signs along entire site perimeter
- Site Restoration

RAA 7: Hot Spot Removal and Capping (Low-Occupancy Land Use)

\$517,800

- Excavation of soils >100 mg/kg PCBs
- Soil cover over remaining soils that exceed low-occupancy land use goals
- Solidification and removal of lagoon sediments
- Site Restoration
- Fencing along entire site perimeter to protect potential recreational trespassers

RAA 8: Excavation and Landfill Disposal (Recreational Land Use, “No Access Restrictions”)

\$1,181,100

- Excavation of contaminated soil in excess of recreational land use goals (PCBs > 7.7 mg/kg), including wetlands and wooded areas
- Off-site disposal to appropriate permitted facilities
- Solidification and removal of lagoon sediments
- Site restored to pre-excavation conditions
- Wetlands restoration
- Fencing along northern site border to protect potential recreational trespassers

RAA 8a: Excavation and Landfill Disposal (Recreational Land Use, “Access Restrictions”)

\$996,900

- Excavation of contaminated soil in excess of recreational land use goals (PCBs > 7.7 mg/kg), excluding wetlands and wooded areas
- Off-site disposal to appropriate facilities
- Solidification and removal of lagoon sediments
- Fencing upper northwest corner of the site (area to be designated as low-occupancy)
- Fencing along northern site border to protect potential recreational trespassers

Groundwater:

GW RAA 1: No Action

\$0

- No remedial actions taken

GW RAA 2: Groundwater Monitoring and Institutional Controls

\$67,300

- Completion of a minimum of four groundwater sampling events
- Aquifer use restrictions (until remedial cleanup goals are achieved)

**EVALUATION OF
ALTERNATIVES**

**Overall Protection of
Human Health and the
Environment**

During the FS process, each of the RAAs were assessed against nine evaluation criteria that are identified within the NCP and USEPA guidance documents. The nine criteria are compared for the soil RAAs for Site 84 as follows. It is unnecessary to compare the groundwater RAAs since no active treatment alternatives are presented. The estimated present worth of each RAA is presented in the previous section.

Each alternative will protect human health and the environment for the desired future land use with the exception of RAA 1, the no action alternative. The RAA 2 and RAA 8 “no access restrictions” options are the most protective of human health and the environment because in these alternatives soils and lagoon sediments exceeding high occupancy or recreational cleanup goals are removed from the site. RAA 4, RAA 5 and RAA 6 are protective of human health because these alternatives include removal of soils and lagoon sediments that exceed low occupancy cleanup goals. RAAs 3, 3a, and 7 offer reduced or eliminated exposure pathways for high occupancy (RAA 3 and RAA 3a) and low occupancy (RAA 7) land uses. RAA 2, RAA 3, and RAA 8 also have an “access restrictions” option in which site contamination is excavated, treated, or capped except for the upper northwest corner of the site. This area is protective of human health and the environment through access restrictions and institutional controls.

Human health risk for soil and sediment at Site 84 only exceeded acceptable limits under the future residential adult and child scenario for soil and sediments exposure. Risk values for soils and sediments generated

under the current land use and future construction worker and commercial worker scenarios at Site 84 were within EPA acceptable limits.

Compliance with ARARs

All of the RAAs, except for no action, meet chemical-specific ARARs and remedial goals for the designated future land use. PCBs are persistent in the environment and are not likely to naturally attenuate to acceptable levels under the no action alternative. Location-specific and action-specific ARARs are met as applicable within each RAA.

Long-Term Effectiveness

The no action alternative will not be effective over the long term in protecting human health and the environment because the contaminants will remain at the site and will not be contained, removed or treated. Both options for RAA 2 and RAA 8 will be effective in the long term because site contamination is removed or treated to meet high-occupancy or recreational land use cleanup levels. RAA 3, a high-occupancy capping alternative, will be effective in the long term if the soil cover is properly maintained into the future. RAAs 5 and 6 will be effective for low-occupancy land use because the LUCIPs will reduce exposure pathways. RAA 7, a low-occupancy capping option, will be effective for low-occupancy land use if the soil cover is properly maintained into the future.

The “no access restrictions” options of RAA 2 and RAA 8 offer the most effective long-term permanence and effectiveness. They also require no land use controls. The “access restrictions” option of these three RAAs will require partial access restrictions, if selected. Intrusive activity restrictions are required for RAAs 3, 4, 5, 6 and 7. Each of the low-occupancy alternatives (RAAs 4, 5, 6, and 7) requires future land use restrictions.

Reduction of Toxicity, Mobility or Volume Through Treatment

The no action alternative will not reduce the toxicity, mobility, or volume of contaminated soil at the site. None of the alternatives include treatment, thus none will reduce the toxicity, mobility or volume of the contaminated soils and sediments through treatment. RAAs 3 and 7 (capping for high and low-occupancy, respectively) will reduce the mobility of contaminants but not the toxicity or volume of the soil itself. However, because capping will reduce contact with contaminated soil by human and ecological receptors, the potential toxicity will be reduced.

The “no access restrictions” option of RAAs 2 and 8 will reduce the toxicity, mobility, or volume through removal of contaminants from the site. The “access restrictions” option for RAAs 2 and 8 will excavate and remove or treat contaminants in all but the upper northwest corner of the site. This portion of the site will be fenced, thereby eliminating the exposure pathway and thus toxicity of the area. RAAs 4, 5, and 6 will reduce the volume, toxicity or mobility of the soil by excavation and landfill disposal, however, the toxicity is reduced only to levels acceptable for low-occupancy land uses.

Short-Term Effectiveness

The no action alternative is not effective for protecting human health and the environment in the short term. The contaminants will remain in place and will not be disturbed. The other alternatives all require excavation of contaminated soil that could increase the exposure of construction workers and ecological receptors to contaminated soils in the short term. However, exposure to human health and the environment will be minimized by the proper use of personal protective equipment, erosion and sediment control measures, and dust controls. It is estimated that most of the alternatives can be implemented in less than one year.

Implementability

The no action alternative requires no effort to implement because no actions will be taken. All of the other alternatives are easy to implement, and require only simple excavation and landfill disposal, placement of soil cover, wetland restoration, and/or implementation of institutional controls.

Land use controls are not required for the “no access restrictions” options of RAA 2 and the no action alternative. The “access restrictions” option of RAAs 2, 3 and 8 will require partial access restrictions. Intrusive activity restrictions are placed on RAAs 3, 4, 5, 6 and 7. Each of the low-occupancy alternatives (RAAs 4, 5, 6, and 7) requires land use restrictions. The required land use controls are implemented through the Base master planning process.

Regulatory Acceptance

NC DENR and the USEPA, the state and Federal regulatory agencies, have reviewed all of the RAAs presented in this PRAP and have approved the preferred alternatives.

Community Acceptance

This criterion has not yet been evaluated. It will be considered following the receipt of comments generated during the public comment period.

SUMMARY OF PREFERRED ALTERNATIVES

The preferred remedial alternative for soil and sediment at Site 84 is:

RAA 4: Excavation and Landfill Disposal (Low-Occupancy Land Use)

- PCB, pesticide and SVOC contaminated soils exceeding USEPA remedial goals and the North Carolina UST program remedial goals will be removed from the site.

Actions to be taken:

- Soil removal and disposal in Base landfill or TSCA permitted facility, as appropriate
- Confirmatory sampling to ensure that all soil exceeding remedial goals has been excavated
- Solidification and removal of lagoon sediments
- Regrading and revegetation to pre-excavation conditions
- Fencing along entire site perimeter to protect potential recreational trespassers
- Non-industrial land use controls and intrusive activity controls to be established in a LUCIP

The preferred remedial alternative for groundwater at Site 84 is:

GW RAA 2: Groundwater Monitoring and Institutional Controls

- Monitoring of inorganics, pesticides, and VOCs which exceeded NCWQS or Federal MCLs
- Groundwater monitoring will continue until remedial goals are achieved

Actions to be taken:

- A minimum of four rounds of groundwater sampling events
- Groundwater samples will be analyzed for pesticides, inorganics, and VOCs
- A LUCIP will be developed to ensure that groundwater control boundaries will be maintained by the Base through their Base Master Planning Process. LUCIP boundaries for aquifer use restrictions and intrusive activity will be in effect until remedial goals are achieved.

PUBLIC PARTICIPATION

The DoN encourages public participation in their environmental program. Public meetings are held in order to solicit public comments and input as to the remedial action selection process as well as provide information about the continuing environmental studies. This PRAP for OU No. 19 is available for public review and comment. The location where this document and other relevant reports can be reviewed, as well as the contact persons for requests of additional information are presented below.

Onslow County Library
58 Doris Avenue East
Jacksonville, NC 28540
Mon.-Thurs. 9:00 a.m. to 9:00 p.m.
Fri.-Sat. 9:00 a.m. to 6:00 p.m.

MCB, Camp Lejeune
Installation & Environmental Division
Building 58, Room 238
Marine Corps Base
Camp Lejeune, NC 28542

MCB, Camp Lejeune will hold a public information meeting on June 18, 2002 at the Coastal Carolina Community College at 6:00 p.m. The 30-day public comment period will begin on June 18, 2002 and is designed to aid in the selection of a final remedial alternative.

POINTS OF CONTACT

To provide comments on the PRAP, please contact either:

Mr. Kirk Stevens, P.E., Code EV23
Commander, Atlantic Division
Naval Facilities Engineering Command
1510 Gilbert Street (Building N-26)
Norfolk, Virginia 23511-2699
(757) 322-8422

or

Mr. Rick Raines
Environmental Quality Branch
Environmental Management Division
Installation & Environmental Department
AC/S I&E
Building 58
Marine Corps Base, PSC Box 20004
Camp Lejeune, NC 28542-0004
(910) 451-5068